WATER SUPPLY OUTLOOK
and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS
for
MONTANA

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE,
and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with Federal, State, and private organizations listed on the inside back cover of this report.

AS OF
JAN. 1, 1964

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

To Recipients of Water Supply Outlook Reports:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Water Supply Forecasting Unit, Soil Conservation Service, P.O. Box 2807, Portland, Oregon 97208.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
WESTERN UNITED STATES	MONTHLY (FEB.-MAY)	PORTLAND, OREGON	ALL COOPERATORS
BASIC DATA SUMMARY	OCTOBER 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ALASKA	MONTHLY (MAR.-MAY)	PALMER, ALASKA	ALASKA S.C.D.
ARIZONA	SEMI-MONTHLY (JAN.15 - APR.1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO	MONTHLY (JAN.-JUNE)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
MONTANA	MONTHLY (JAN.-JUNE)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
NEVADA	MONTHLY (JAN.-MAY)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-JUNE)	PORTLAND, OREGON	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH	MONTHLY (JAN.-JUNE)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-JUNE)	SPOKANE, WASHINGTON	WN. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

PUBLISHED BY OTHER AGENCIES

REPORTS	ISSUED	AGENCY
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

WATER SUPPLY OUTLOOK

FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS

for

MONTANA

Report Prepared

By

Phillip E. Farnes

and

Stanley E. Cook

Snow Survey and Water Supply Forecasting Section
Soil Conservation Service
Box 855
Bozeman, Montana

Issued By

H. D. Hurd
State Conservationist
Soil Conservation Service
Bozeman, Montana

J. A. Asleson, Director
Montana Agricultural
Experiment Station
Bozeman, Montana

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MONTANA
WATER SUPPLY OUTLOOK
as of
January 1, 1964

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* * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                 *
* The water supply outlook for the coming irrigation *
* season is generally FAIR to POOR.               *
*                                                 *
* Snow surveys made near January 1, mountain soil *
* moisture and irrigation reservoir storage are all *
* below average, pointing the way for a possible  *
* water shortage unless mountain precipitation is *
* well above average during the next few months.  *
*                                                 *
* * * * * * * * * * * * * * * * * * * * * * * * * *
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Snow surveys made near the first of January in the Flathead River basin indicate the mountain snow pack is 118 percent of last year and 63 percent of the 1943-57 average.

In the Clark Fork drainage the water stored in the snow pack is 130 percent of last year and 68 percent average.

Gibbons Pass, the only course measured in the Bitterroot drainage, has the same water content as last year, which is 64 percent of the 1943-57 average.

East of the Continental Divide the headwaters of the Missouri, which encompasses the Jefferson, Madison and Gallatin River drainages, have a snow pack that is 132 percent of last year and 69 percent average.

Along the Main Stem of the Missouri River the snow pack is 122 percent of last year and 71 percent average.

The Yellowstone River headwaters have a deficient snow cover. The January readings are 5 percent less than a year ago and only 58 percent of the 1943-57 average.

Mountain soil moisture is generally below average with most areas somewhat drier than a year ago. Soil moisture conditions are generally better near the Continental Divide from the southwest corner to the center of the state.

Storage in irrigation reservoirs is generally below average while power reservoirs are above average.

SNOW COURSES
AND SOIL MOISTURE STATIONS
IN
MONTANA
LEGEND
TOWNS AND CITIES
13D04 SNOW COURSE
13D04 SOIL MOISTURE STATION
13D04 SNOW COURSE & SOIL MOISTURE STATION
DRAINAGE BOUNDARIES
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
BOZEMAN, MONTANA
SCALE IN MILES
50 25 0 50 100
KOOTENAI
ST. MARY
MILK
MARIAS
MILK
FLATHEAD
TETON
SUN
MAIN STEM
CLARK FORK
BLACKFOOT
MISSOURI
JUDITH
MUSSELSHELL
LOWER YELLOWSTONE
YELLOWSTONE
BITTERROOT
ROOT
BIG HOLE
JEFFERSON
BEAVERHEAD
RUBY
MADISON
GALLATIN
UPPER YELLOWSTONE
IDAHO
SOUTH DAKOTA
MONTANA
WYOMING
REVISED 10-63
5R-11,484

INDEX TO MONTANA SNOW COURSES AND SOIL MOISTURE STATIONS

SNOW COURSES

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
COLUMBIA RIVER BASIN								
KOOTENAI RIVER								
Baree Creek	15B11	5500	36	26N	31W	1956	3,4,5,5½	2
Brush Creek	14A04	5000	12	30N	26W	1937	3,4,5	1,2
Red Mountain	15A01	6000	4	36N	29W	1937	3,4,5,5½,6	1,2
Weasel Divide	14A07	5450	8	37N	24W	1937	3,4,5,5½,6	1,2
FLATHEAD RIVER								
Bassoo Peak	14B03	5150	11	24N	25W	1961	3,4,5	1,2
Big Creek	13B03	6750	7	22N	18W	1941	3,4,5, 6	1,3
Camp Misery	13A17	6400	30	28N	18W	1962	3,4,5,	1,2
Desert Mountain	13A02	5600	24	31N	19W	1937	1,2,3,4,5, 6	1,2
Fatty Creek	13B04	5500	4	22N	18W	1962	3,4,5, 6	1,3
Griffin Creek Divide	14A09	5150	11	28N	25W	1960	3,4,5	1,3
Hell Roaring Divide	14A03	5770	35	32N	22W	1942	1,2,3,4,5,5½,6	2
Holbrook	13B13	4530	18	21N	13W	1951	2,3,4,5	1
Kishenehn	14A06	3890	14	37N	22W	1954	3,4	6
Logan Creek	14A05	4300	34	30N	24W	1937	3,4,5	1,2
Marias Pass	13A05	5250	34	30N	14W	1934	1,2,3,4,5	3
Mineral Creek	13A16	4000	29	35N	17W	1957	3,4,5	6
North Fork Jocko	13B07	6330	3	17N	17W	1941	3,4,5,5½,6	1,2
Spotted Bear Mountain	13B02	7000	23	25N	15W	1948	1,2,3,4,5	1,2
Strawberry Lake	13A10	5600	11	28N	19W	1948	3,4,5	1
Trinkus Lake	13B01	6500	9	25N	17W	1948	3,4,5	1
Twin Creeks	13B11	5580	24	26N	16W	1951	1,2,3,4,5	1,2
Upper Holland Lake	13B05	7000	28	20N	15W	1948	3,4,5	1
CLARK FORK RIVER								
Black Pine	13C13	7100	23	8N	15W	1959	3,4,5	1
Copper Creek	12B10	5700	1	15N	9W	1962	3,4,5	1,2
Cotter Mine	12B11	6250	2	15N	9W	1962	3,4,5	1,2
Coyote Hill	13B10	4200	12	18N	16W	1947	1,2,3,4,5	1,2
El.Dorado Mine	13C09	7800	23	8N	12W	1949	3,4	1
Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Gold Creek Lake	13C10	7200	14	8N	12W	1949	3,4	1
Hoodoo Creek	15C01	6200	9	14N	27W	1937	3,4,5	1,2
Intergaard	13C04	6450	6	5N	13W	1936	2,3,4,5	4
Lubrecht Forest No. 3	13C21	5450	19	13N	12W	1951	1,2,3,4,5	8
Lubrecht Forest No. 4	13C22	4650	23	13N	15W	1951	1,2,3,4,5	8
Lubrecht Forest No. 6	13C08	4040	11	13N	15W	1951	1,2,3,4,5	8
Red Lion	13C12	7100	22	6N	13W	1958	3,4,5	1
Skalkaho Summit	13C03	7260	30	6N	17W	1937	3,4,5,5½,6	1
Slide Rock Mountain	13C02	7100	35	10N	16W	1937	3,4,5	1
Southern Cross	13C05	6500	8	5N	13W	1936	2,3,4	4
Stone Lake	13C07	7780	19	4N	13W	1939	1,2,3,4,5	1
Stuart Mill	13C06	6500	19	5N	13W	1936	2,3,4	4
Stuart Mountain	13C01	7400	6	14N	18W	1936	1,2,3,4,5, 6	8
TV Mountain	14B01	6800	33	15N	19W	1956	1,2,3,4,5	8
BITTERROOT RIVER								
Ambrose	13C16	6480	28	9N	18W	1960	3,4,5	1
East Fork R. S.	13D01	5400	16	2N	17W	1937	3,4	1
Gibbons Pass	13D02	7100	4	2S	19W	1934	1,2,3,4,5,5½,6	1,3
Lost Horse	14D07	5940	5	4N	23W	1960	3,4,5	1
Nez Perce Camp	14D02	5580	19	1S	23W	1937	3,4,5	1
Nez Perce Pass	14D01	6970	25	1S	24W	1937	3,4,5	1
Twin Lakes	14D08	6510	32	5N	23W	1960	3,4,5	1
SASKATCHEWAN RIVER BASIN								
Iceberg Lake No. 3	13A03	5600	1	35N	17W	1922	5	3,9
Josephine Lower No. 9	13A14	4900	22	35N	16W	1955	5	3,9
Mount Allen No. 7	13A07	5700	27	35N	16W	1922	5	3,9
Piegan Pass No. 6	13A06	5500	27	35N	16W	1922	5	3,9
Ptarmigan No. 8	13A08	5800	36	36N	17W	1937	5	3,9
MISSOURI RIVER BASIN								
BEAVERHEAD RIVER								
Bloody Dick	13D10	7600	12	8S	16W	1948	3,4,5	1
Carter Creek	12D04	7400	22	8S	7W	1963	3,4	1
Gold Stone	13D09	8100	11	8S	16W	1948	3,4,5	1
Lakeview Canyon	11E04	6930	26	14S	2W	1948	3,4,5	10
Lakeview Ridge	11E03	7400	27	14S	2W	1948	3,4,5	10
Lemhi Pass	13E01	7480	9	10S	15W	1948	3,4	1
Trail Creek	13E02	7090	15	10S	15W	1948	3,4	1
White Pine Ridge	12E01	8850	18	14S	5W	1948	3,4,5	1
RUBY RIVER								
Clover Meadow	11D08	8600	28	9S	2W	1963	3,4,5	1
Divide	12E07	7900	14	12S	4W	1963	3,4,5	1
Notch	12E06	8500	18	11S	4W	1963	3,4,5	1
BIG HOLE RIVER								
Abundance Lake	13D20	8800	7	3S	11W	1963	3,4,5	1
Darkhorse Lake	13D19	8600	4	8S	16W	1963	3,4,5	1
Elk Horn Springs	13D15	7800	21	4S	12W	1935	3,4,5	3
Foolhen	13D21	8500	11	1S	13W	1963	3,4,5	1
Jahnke Creek	13D08	7340	25	7S	16W	1948	3,4,5	1
JEFFERSON RIVER								
Berry Meadow	12C07	7300	17	5N	5W	1962	3,4,5	1
Picnic Grounds	12C06	6500	10	5N	6W	1941	2,3,4	4
Pipestone Pass	12D01	7200	10	1N	7W	1938	1,2,3,4,5	1
MADISON RIVER								
Cell Road	11D07	8050	21	8S	2W	1962	3,4,5	1
Crockett Lake	11D06	8400	20	8S	2W	1962	3,4,5	1
Hebgen Dam	11E05	6550	22	11S	3E	1934	1,2,3,4,5	3
Jack Creek	11D05	6800	13	6S	1E	1961	3,4	1
North Meadow	11D03	7500	23	3S	3W	1961	3,4	1
West Yellowstone	11E07	6700	34	13S	5E	1934	1,2,3,4,5	3
GALLATIN RIVER								
Arch Falls	10D14	7350	3	5S	6E	1963	2,3,4,5	1
Bear Basin	11D09	8150	9	6S	3E	1963	3,4,5	1
Devil's Slide	10D04	8100	14	5S	6E	1935	2,3,4,5, 6	1
Hood Meadow	10D03	6600	22	4S	6E	1935	2,3,4,5	1
Little Park	11D10	7400	22	6S	3E	1963	3,4,5	1
New World	10D01	6700	24	3S	6E	1929	2,3,4	1
Twenty-One Mile	11E06	7150	1	11S	5E	1934	1,2,3,4,5	3
MISSOURI RIVER MAIN STEM								
Boulder Mountain	11C01	7950	1	9N	3E	1963	3,4	1
Chessman Reservoir	12C05	6200	2	8N	5W	1936	1,2,3,4,5	3
Crystal Lake	9C01	6100	19	12N	12E	1941	3,4	1
Elk Peak	10C07	8000	10	8N	8E	1963	3,4,5	1
Grasshopper	10C02	7000	19	9N	8E	1938	3,4	1
Kings Hill	10C01	7500	34	13N	8E	1934	3,4,5	3
Rocky Boy	9A01	5200	13	28N	16E	1941	3,4	7
Steeple Pass	12C01	6900	16	13N	7W	1934	3,4,5	3
Ten Mile Lower	12C02	6250	13	8N	6W	1935	1,2,3,4,5	3
Ten Mile Middle	12C03	6800	13	8N	6W	1934	1,2,3,4,5	3
Ten Mile Upper	12C04	8000	19	8N	5W	1935	1,2,3,4,5	3
SUN-TRITON-MARIAS RIVERS								
Cabin Creek	12B06	5400	33	23N	10W	1949	3,4,5	1
Five-Bull	12B09	5600	36	20N	10W	1948	3,4	1
Freight Creek	12A01	6000	13	26N	10W	1948	3,4,5	1
Goat Mountain	12B07	7000	20	22N	10W	1934	3,4,5	3
Waldron Creek	12B02	5600	16	25N	9W	1948	3,4,5	1
West Fork	12B01	6000	6	25N	9W	1948	3,4,5	1
Wrong Creek	12B03	5700	32	25N	10W	1949	3,4,5	1
Wrong Ridge	12B03	6800	17	25N	10W	1949	3,4,5	1
JUDITH RIVER								
Spur Park	10C06	8000	20	12N	9E	1963	3,4,5	1
UPPER YELLOWSTONE RIVER								
Bald Ridge	10C05	7500	11	4N	10E	1961	3,4,5	1
Camp Senia	9D01	7890	2	8S	18E	1937	3,4,5	1
Crevice Mountain	12D05	8400	22	9S	9E	1935	3,4	2
Grizzly Peak	9D05	8400	26	7S	19E	1961	1,2,3,4,5	1
Independence	10D06	8000	22	7S	12E	1940	3,4,5	1
Monument Peak	10D12	9000	22	7S	12E	1961	3,4,5	1
Northeast Entrance	10D07	7400	33	9S	14E	1937	1,2,3,4,5	6
Porcupine R. S.	10C03	6500	10	4N	10E	1938	3,4,5	1
Timberline Creek	9D04	8850	10	8S	18E	1961	3,4,5	1
Sacajawea	10D10	6550	36	2N	6E	1960	3,4,5	1
West Rosebud	9D02	7500	9	7S	16E	1960	3,4	4

SOIL MOISTURE STATIONS

Drainage Basin & Course Name	Number	Elev.	Sec.	Twp.	Range	Record Began	Measuring Dates 1/	Meas. By 2/
COLUMBIA RIVER BASIN								
FLATHEAD RIVER								
Desert Mountain	13A02M	5600	24	31N	19W	1956	Monthly	1
Marias Pass	13A05M	5250	34	30N	14W	1950	Monthly	1
CLARK FORK RIVER								
Georgetown Lake	13C15M	6450	6	5N	13W	1962	Monthly	1
Lubrecht Forest	13C14M	4100	11	13N	15W	1961	Monthly	8
Seeley Lake	13B19M	4030	21	17N	15W	1963	Monthly	2
BITTERROOT RIVER								
Gibbons Pass	13D18M	7100	4	2S	19W	1962	Monthly	1
Lolo Pass	14D05M	5250	11	10N	24W	1963	Monthly	1
MISSOURI RIVER BASIN								
BEAVERHEAD RIVER								
Lakeview	11E13M	6700	23	14S	2W	1962	Monthly	10
MADISON RIVER								
Red Bluff	11D04M	4800	7	3S	1E	1961	Monthly	7
GALLATIN RIVER								
College Site	11D02M	4856	18	2S	5E	1956	Monthly	1
Twenty-One Mile	11E06M	7150	1	11S	5E	1963	Monthly	6
MISSOURI RIVER MAIN STEM								
Steeple Pass	12C08M	6350	16	13N	7W	1963	Monthly	1
Kings Hill	10C01M	7420	34	13N	8E	1963	Monthly	1
YELLOWSTONE RIVER								
Battle Ridge	10D11M	6020	32	2N	7E	1960	Monthly	1
Northeast Entrance	10D07M	7350	33	9S	14E	1962	Monthly	6
Shields River	10C04M	5850	4	1N	10E	1960	Monthly	1

LEGEND

1/ Numerals 1,2,3,4,5,5½,6 refer to January 1, February 1, March 1, April 1, May 1, May 15 and June 1.

2/ Numerals refer to Agency that secures the snow survey as follows:

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. Montana State Forestry School
9. Dominion Water & Power Bureau
10. Bureau of Sport Fisheries & Wildlife

M - Soil Moisture

5,R-11,1,64

SOIL MOISTURE DATA

AS OF JULY 1, 1963

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	7/12	8.6	7.1	8.1
13A05M	Marias Pass	5250	54	6.5	6/30	6.0	5.2	5.1
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	6/26	7.4	7.3	-
13B19M	Seeley Lake	4030	48	10.6	-	-	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	6/28	6.8	6.3	-
14C05M	Lolo Pass	5250	48	8.5	6/28	8.6	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	7/1	14.8	12.8	-
Madison								
10D04M	Red Bluff	4800	40	4.7	-	-	-	-
Gallatin								
11D02M	College Site	4856	54	14.5	6/29	11.6	10.0	9.1
11E06M	Twenty-One Mile	7150	48	8.8	6/28	8.1	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	6/28	10.8	-	-
12C08M	Stemple Pass	6350	48	5.9	7/2	5.4	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	7/1	17.7	15.6	-
10D07M	Northeast Entrance	7350	48	9.4	6/30	8.9	8.1	-
10C04M	Shields River	5850	48	17.8	7/1	14.7	13.8	-

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF AUGUST 1, 1963

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	7/31	7.0	5.1	6.2
13A05M	Marias Pass	5250	54	6.5	7/30	4.4	3.6	3.8
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	7/30	6.3	4.4	-
13B19M	Seeley Lake	4030	48	10.6	8/4	6.1	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	7/30	5.8	5.9	-
14C05M	Lolo Pass	5250	48	8.5	7/29	6.9	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	8/1	8.2	9.8	-
Madison								
10D04M	Red Bluff	4800	40	4.7	-	-	1.4	-
Gallatin								
11D02M	College Site	4856	54	14.5	8/2	8.4	10.0	7.3
11E06M	Twenty-One Mile	7150	48	8.8	7/28	4.3	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	7/31	9.6	-	-
12C08M	Stemple Pass	6350	48	5.9	7/31	4.6	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	8/1	12.3	10.8	-
10D07M	Northeast Entrance	7350	48	9.4	7/31	6.4	8.7	-
10C04M	Shields River	5850	48	17.8	8/1	9.3	9.4	-

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF SEPTEMBER 1, 1963

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	9/5	4.6	4.8	4.6
13A05M	Marias Pass	5250	54	6.5	8/31	2.8	3.2	3.7
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	8/26	2.6	2.6	-
13B19M	Seeley Lake	4030	48	10.6	8/31	3.8	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	8/28	4.9	5.0	-
14C05M	Lolo Pass	5250	48	8.5	8/30	4.3	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	8/31	6.3	7.0	-
Madison								
10D04M	Red Bluff	4800	40	4.7	-	-	1.7	-
Gallatin								
11D02M	College Site	4856	54	14.5	8/30	7.4	8.5	6.4
11E06M	Twenty-One Mile	7150	48	8.8	8/28	1.8	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	8/30	8.7	-	-
12C08M	Stemple Pass	6350	48	5.9	9/3	5.1	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	8/30	8.0	8.3	-
10D07M	Northeast Entrance	7350	48	9.4	8/31	5.0	6.9	-
10C04M	Shields River	5850	48	17.8	8/30	7.6	7.3	-

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF OCTOBER 1, 1963

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	10/3	4.7	4.0	5.4
13A05M	Marias Pass	5250	54	6.5	10/1	2.9	3.2	3.8
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	9/30	2.6	2.3	-
13B19M	Seeley Lake	4030	48	10.6	-	-	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	9/26	5.6	4.5	-
14C05M	Lolo Pass	5250	48	8.5	9/26	4.3	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	9/30	7.6	5.8	-
Madison								
10D04M	Red Bluff	4800	40	4.7	-	-	1.2	-
Gallatin								
11D02M	College Site	4856	54	14.5	9/27	6.3	7.8	6.6
11E06M	Twenty-One Mile	7150	48	8.8	9/29	4.5	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	10/2	7.8	-	-
12C08M	Stemple Pass	6350	48	5.9	9/30	4.5	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	9/30	8.2	7.5	-
10D07M	Northeast Entrance	7350	48	9.4	9/30	8.4	7.5	-
10C04M	Shields River	5850	48	17.8	9/30	9.4	7.1	-

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF NOVEMBER 1, 1963

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	11/12	5.1	6.4	5.9
13A05M	Marias Pass	5250	54	6.5	11/5	3.2	-	4.7
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	10/29	2.6	3.3	-
13B19M	Seeley Lake	4030	48	10.6	10/31	1.2	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	10/30	5.8	6.1	-
14C05M	Lolo Pass	5250	48	8.5	10/30	4.2	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	10/31	5.9	5.8	-
Madison								
10D04M	Red Bluff	4800	40	4.7			-	-
Gallatin								
11D02M	College Site	4856	54	14.5	11/1	6.4	7.8	7.5
11E06M	Twenty-One Mile	7150	48	8.8	11/3	3.7	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	10/31	7.9	-	-
12C08M	Stemple Pass	6350	48	5.9	11/2	3.8	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	10/29	8.1	13.5	-
10D07M	Northeast Entrance	7350	48	9.4	11/2	8.0	7.7	-
10C04M	Shields River	5850	48	17.8	10/29	8.9	8.4	-

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF DECEMBER 1, 1963

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	-	-	-	-
13A05M	Marias Pass	5250	54	6.5	12/1	4.0	-	4.9
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	11/26	2.6	3.5	-
13B19M	Seeley Lake	4030	48	10.6	12/2	1.2	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	11/26	5.6	6.1	-
14C05M	Lolo Pass	5250	48	8.5	11/29	4.9	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	11/30	8.9	5.5	-
Madison								
10D04M	Red Bluff	4800	40	4.7			2.1	-
Gallatin								
11D02M	College Site	4856	54	14.5	11/29	6.5	11.8	9.0
11E06M	Twenty-One Mile	7150	48	8.8	11/30	4.0	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	12/2	7.8	-	-
12C08M	Stemple Pass	6350	48	5.9	11/25	4.1	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	12/2	9.2	14.4	-
10D07M	Northeast Entrance	7350	48	9.4	11/30	8.0	7.5	-
10C04M	Shields River	5850	48	17.8	12/2	9.3	8.6	-

**AVERAGE FOR PERIOD OF RECORD

SOIL MOISTURE DATA

AS OF JANUARY 1, 1964

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE
			COLUMBIA RIVER BASIN					
Flathead								
13A02M	Desert Mountain	5600	54	8.4	12/31	5.6	6.8	6.7
13A05M	Marias Pass	5250	54	6.5	12/26	4.1	5.5	4.8
Clark Fork								
13C15M	Georgetown Lake	6450	48	8.3	12/27	5.7	3.3	-
13B19M	Seeley Lake	4030	48	10.6	1/2	1.4	-	-
Bitterroot								
13D18M	Gibbons Pass	7100	48	7.1	12/26	5.6	5.9	-
14C05M	Lolo Pass	5250	48	8.5	12/27	4.9	-	-
			MISSOURI RIVER BASIN					
Beaverhead								
11E13M	Lakeview	6700	48	15.3	12/31	8.6	5.5	-
Madison								
10D04M	Red Bluff	4800	40	4.7	12/30	1.7	2.6	-
Gallatin								
11D02M	College Site	4856	54	14.5	1/3	6.6	12.3	8.9
11E06M	Twenty-One Mile	7150	48	8.8	12/29	3.9	-	-
Missouri Main Stem								
10C01M	Kings Hill	7420	48	11.8	1/3	7.8	-	-
12C08M	Stemple Pass	6350	48	5.9	12/30	4.0	-	-
Yellowstone								
10D11M	Battle Ridge	6020	48	15.4	12/30	9.2	13.8	-
10D07M	Northeast Entrance	7350	48	9.4	12/31	7.9	7.2	-
10C04M	Shields River	5850	48	17.8	12/30	9.1	9.3	-

**AVERAGE FOR PERIOD OF RECORD

SNOW SURVEY DATA

AS OF JANUARY 1, 1964

(Inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
						WATER CONTENT	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE
	COLUMBIA RIVER BASIN						
FLATHEAD RIVER							
13A02	Desert Mountain	5600	12/31	22	5.2	4.0	6.4*
14A03	Hell Roaring Divide	5770	12/31	38	10.6	-	-
13A05	Marias Pass	5250	12/28	22	5.2	5.8	8.1
13B02	Spotted Bear Mountain	7000	1/2	18	4.0	3.3	7.7*
13B11	Twin Creeks	3580	1/3	11	2.8	1.5	5.3*
CLARK FORK RIVER							
13B10	Coyote Hill	4200	12/31	12	2.3	1.2	5.0*
15B02	Lookout	5250	12/30	49	12.8	9.0	16.4*
13C21	Lubrecht Forest No. 3	5450	12/26	16	2.6	-	2.9*
13C22	Lubrecht Forest No. 4	4650	12/26	11	1.7	-	1.6*
13C08	Lubrecht Forest No. 6	4040	12/26	12	1.8	0	1.5*
13C18	Spring Gulch	6000	12/30	19	3.8	1.3	-
13C07	Storm Lake	7780	12/27	19	3.8	5.6	6.6*
13C01	Stuart Mountain	7400	12/30	40	11.0	7.4	-
14B01	TV Mountain	6800	12/27	26	5.0	4.0	8.3*
BITTERROOT RIVER							
13D02	Gibbons Pass	7100	12/26	32	8.1	8.1	12.7*

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). *ADJUSTED AVERAGE

SNOW SURVEY DATA

As of January 1, 1964

Index Number	Name	Elevation	Snow Course Data: Date of Survey	Snow Course Data: Snow Depth	Snow Course Data: Water Content	Snow Course Data: Percent of Normal	Snow Course Data: Last Year's Percent
CALIFORNIA RIVER BASIN							
FEATHER RIVER							
1A02E	Desert Mountain	5000	12/31	24	5.2	0	0.0*
1A02J	Fall Meadow Divide	5700	12/31	34	10.6	-	-
1A03J	Mercer Fork	4950	12/31	22	4.2	5.8	5.1
1A04	Spoonbed Bear Mountain	7000	1/3	18	4.0	3.3	2.7*
1A11	Twin Crossing	3500	1/3	11	2.8	1.5	5.3*
YUBA RIVER BASIN							
1A01E	Sawtooth Hill	4200	12/31	12	2.3	1.2	5.0*
1A02C	Lookout	5530	12/31	49	12.8	9.0	16.4*
1A02E	Independence Forest Mon. 3	3430	12/26	16	3.0	-	2.5*
1A02G	Independence Forest Mon. 4	4600	12/26	11	1.7	-	1.2*
1A02H	Independence Forest Mon. 6	1400	12/26	12	1.8	0	1.3*
1A03A	Spring Gulch	4700	12/27	15	3.8	1.3	-
1A03D	Storms Lake	7400	12/27	19	3.8	2.6	6.4*
1A03G	Sierra Mountain	7400	12/27	40	11.0	7.4	-
1A04C	TV Mountain	6500	12/27	26	5.0	4.0	8.3*
BUTTERWORTH BASIN							
1A05C	Gibsons Pass	7700	12/26	32	8.3	8.1	12.7*

SNOW SURVEY DATA

AS OF JANUARY 1, 1964

(inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
						WATER CONTENT	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE
	MISSOURI RIVER BASIN						
BEAVERHEAD RIVER							
12E03	Camp Creek	6800	12/30	15	2.8	2.2	4.2*
11E12	Kilgore	6200	12/27	16	2.4	2.1	4.6*
JEFFERSON RIVER							
12D01	Pipestone Pass	7200	12/26	8	1.6	3.0	2.7*
MADISON RIVER							
11E09	Big Springs	6500	12/29	26	5.8	3.2	8.2
11E05	Hebgen Dam	6550	1/2	20	4.2	2.2	5.9
11E10	Island Park	6315	12/29	23	4.5	3.0	6.4
10E02	Norris Basin	7500	12/26	18	3.8	3.1	4.6*
11E08	Valley View	6500	12/29	22	4.6	4.7	5.8
11E07	West Yellowstone	6700	1/2	17	3.4	2.3	5.7
GALLATIN RIVER							
11E06	Twenty-One Mile	7150	1/2	27	5.7	3.6	8.6
MISSOURI MAIN STEM							
12C05	Chessman Reservoir	6200	1/4	7	1.5	0.5	2.2
12C02	Tenmile Lower	6250	1/3	12	2.3	1.9	3.5
12C03	Tenmile Middle	6800	1/3	18	3.6	3.4	5.3
12C04	Tenmile Upper	8000	1/3	22	5.1	4.4	6.7
UPPER YELLOWSTONE RIVER							
10E03	Canyon	7750	12/30	28	3.6	4.3	6.3*
10E06	East Entrance	7000	12/30	18	2.9	2.5	4.7*
9D05	Grizzly Peak	8400	12/31	14	2.4	6.0	-
10E04	Lake Camp No. 2	7850	12/30	14	2.1	2.0	4.5*
10E01	Lupine Creek	7300	1/2	17	2.9	3.0	5.1*
10D07	Northeast Entrance	7400	12/31	14	2.8	3.0	4.0*
10E05	Sylvan Pass	7100	12/30	22	4.3	3.9	6.5*
10E07	Thumb Divide	7900	12/30	24	5.6	6.6	10.2*

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). *ADJUSTED AVERAGE

RESERVOIR STORAGE DATA

AS OF DECEMBER 31, 1963

(1000 Acre Feet)

BASIN	RESERVOIR	USEABLE CAPACITY	USEABLE STORAGE THIS YEAR	USEABLE STORAGE LAST YEAR	USEABLE STORAGE AVERAGE
COLUMBIA RIVER BASIN					
Flathead	Hungry Horse	3,428.0	2,995.0	3,155.0	2,883.0**
	Flathead Lake	1,791.0	1,532.0	1,610.0	1,257.0
	Camas 1/	45.2	16.9	24.8	23.8
	Mission Valley 2/	100.3	15.8	25.1	28.2
Clark Fork	Georgetown Lake	31.0	28.4	27.7	25.3
	Noxon	334.6	326.7	331.3	-
Bitterroot	Como	34.9	3.4	15.0	9.3
	Painted Rocks	31.7	-	-	10.6**
MISSOURI RIVER BASIN					
Beaverhead	Lima	84.0	16.4	25.0	32.4
Ruby	Ruby	38.8	-	-	22.7**
Madison	Hebgen Lake	384.8	211.3	233.6	240.3
	Ennis Lake	41.0	39.0	39.4	37.6
Gallatin	Middle Creek	8.0	2.8	4.1	3.1**
Missouri	Canyon Ferry	2,043.0	1,760.0	2,015.0	1,682.0**
	Hauser & Helena	61.9	60.7	53.6	54.9
	Lake Helena	10.4	10.0	7.6	8.3**
	Holter Lake	81.9	70.8	73.0	71.6
	Smith River	10.7	7.1	7.3	5.0**
	Ackley Lake	5.8	-	-	3.9
	Durand	7.0	3.6	5.3	4.3
	Martinsdale	23.1	8.2	8.9	9.5
	Deadman's Basin	72.2	-	42.1	48.5**
	Fort Peck	19,410.0	12,010.0	10,040.0	11,060.0
Sun-Teton	Gibson	105.0	14.9	33.6	43.7
	Willow Creek	32.3	20.8	25.5	18.4
	Pishkun	32.0	17.6	18.5	19.1
Marias	Lower Two Medicine	16.6	1.2	0	0
	Four Horns	19.2	-	-	8.6
	Swift	30.0	8.6	8.6	18.1
	Lake Francis	112.0	33.4	65.9	94.4
	Tiber	1,313.0	639.0	625.7	626.2**
Milk	Fresno	127.2	43.1	36.1	66.6
	Nelson	66.8	34.9	48.3	37.2
	Lake Sherburne	66.1	-	9.2	16.3
Yellowstone	Mystic Lake	20.8	13.8	14.7	14.5
	Tongue River	68.0	-	26.6	7.9
	Cooney	27.5	14.5	-	8.8

1/ Sum of four small reservoirs on west side of Flathead Lake.
2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). **AVERAGE FOR PERIOD OF RECORD

1/ Sum of four small reservoirs on west side of Itasca Lake.
2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.

Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
Region 1, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska
Riverdale, N. D.

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Bureau of Sports Fisheries and Wildlife
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State University
School of Forestry
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch, Dept. of Lands and Forests
Victoria, British Columbia

Department of Northern Affairs and National Resources
Calgary, Alberta

State Engineer
Montana and Wyoming

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P.O. BOX 855
BOZEMAN, MONTANA 59715

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COOPERATIVE SNOW SURVEYS

Furnishes the basic data necessary for forecasting water supply for irrigation, domestic and municipal water supply, hydro-electric power generation, navigation, mining and industry

"The Conservation of Water begins with the Snow Survey"